

PRE-ACQUISITION COMPATIBILITY DETERMINATION

USE: Fishing

REFUGE NAME: Canaan Valley National Wildlife Refuge

DATE ESTABLISHED: August 11, 1994

ESTABLISHING AUTHORITY: Fish and Wildlife Act of 1956
Emergency Wetlands Resources Act of 1986

PURPOSE(S) FOR WHICH ESTABLISHED:

- (1) For the development, advancement, management, conservation, and protection of fish and wildlife resources;
- (2) For the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions.

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is public fishing on beaver ponds and the Blackwater River and its tributaries on a recently acquired tract of the Canaan Valley National Wildlife Refuge (Refuge). Priority public uses of the National Wildlife Refuge System are hunting, fishing, wildlife observation and photography, environmental education, and interpretation. Fishing is a priority public use.

(b) Where would the use be conducted?

The Refuge acquired 11,541 acres (Main Tract) in 2002. The West Virginia Department of Natural Resources stocked black bass in beaver ponds on the property in 1964. No scientific inventory has been conducted to determine what existing beaver ponds still contain fish. About 20 large ponds currently exist but their capacity to support fish habitat is unknown. Beaver ponds are dynamic and sustaining fish habitat is dependent upon beaver activity, climate, and wetland conditions. Beavers continually create new

impoundments and old ponds disappear through abandonment or successional changes that decrease standing water.

Reports from local anglers indicate that black bass are caught in beaver ponds receiving water from Glade Run on the east side of the wetland and the Blackwater River on the west side. Fishing also occurs along the banks of the Blackwater River and its tributaries within the Refuge. Vehicle access to Main Tract waters is primarily from A Frame Road from Route 93 and Delta 13 Road from Camp Seventy Road originating in Davis, WV. Anglers also access the Main Tract by walking from private property. Figure 1 shows the known fishing areas of the Main Tract that includes both pond complexes and the Blackwater River and its tributaries.

Wildlife habitats affected by fishing include water bodies and the vegetation communities between water bodies and access points. Habitats include riparian, freshwater palustrine marsh, bog, wet meadow, grassland, and upland plant communities. The Main Tract consists of approximately 60% upland and 40% wetland habitat. However, fishing access necessitates travel almost entirely through wetland plant communities.

Wetland habitats in the Main Tract comprise approximately 44% of all wetlands within Canaan Valley. Dominant wetland plant communities include 1,055 acres of low shrub swamp thicket, primarily glade St. John's wort (*Hypericum densiflorum*), 599 acres of speckled alder (*Alnus rugosa*) thicket, 540 acres of blueberry (*Vaccinium* spp.) shrub thicket and 532 acres of moss dominated bog primarily sphagnum and hair-cap moss (*Polytricum* spp.). The shrub swamp is regionally significant as it is one of three shrub swamps in the eastern United States more than 1,000 acres in size (Vogelmann 1978). In particular, the diverse plant communities associated with alder shrub swamps often contain unique and rare plant species making this an important habitat type for protection (Fortney 1997 and Vanderhorst 2001).

(b) When would the use be conducted?

Beaver ponds and the Blackwater River are open year round subject to West Virginia State fishing regulations. Ice fishing is allowed. Daily hours of use are between one hour before sunrise and one hour after sunset when the Refuge is open to the public. Fishing occurs year round. Additional information regarding timing of fishing is not known although concentrated use is expected in spring at peak water levels.

(c) How would the use be conducted?

Fishing methods and harvest limits on the Refuge conform to West Virginia State law. Anglers enter the Refuge from parking lots or private land and walk to fishing waters. Bicycle travel on designated trails is also allowed. Anglers park bicycles on designated trail shoulders and walk from there. Cross-country travel by foot is allowed because of seasonal flooding of existing Refuge trails. Ice fishing would be accessed by cross country skiing or snowshoes. An average of 120 inches of snow falls annually in Canaan Valley. No snow removal is conducted on Refuge roads or parking areas. Anglers may

have to park further away from Refuge parking areas for access. Anglers using non-motorized watercraft on the Blackwater River would enter the Refuge from outside Refuge boundaries. Overland transport of watercraft is permitted to facilitate fishing access. Boats must be carried rather than dragged to protect vegetation. Trails closed to public access will be signed and information about fishing will be provided at Refuge kiosks and brochures. Safety and information signs will be installed and maintained as necessary.

A Refuge Officer will record the number of anglers fishing, areas used for fishing, access routes used, timing of use, and any related safety concerns. Anglers may be checked to determine compliance with state and Refuge regulations. Use is monitored annually to determine if it remains compatible subject to the route compatibility criteria shown in Appendix 2 and the monitoring program described in Appendix 3.

(e) Why is this use being proposed?

Fishing existed on the Main Tract when it was acquired in 2002. The former landowner allowed the public to fish existing ponds and the Blackwater River (Monongahela Power Company 1994). No pre-acquisition Compatibility Determination (CD) was approved however, to allow fishing to continue on an interim basis between the time the Refuge acquired the land and the preparation of a Refuge Comprehensive Conservation Plan (CCP). CCP preparation is currently anticipated to begin by 2004. Correcting this oversight would continue to provide an opportunity for the public to engage in a priority public use.

Because of the difficulty crossing wetlands on foot, it is anticipated that few persons fish the refuge. Observations from Refuge staff and anecdotal reports suggest that less than 10 persons per month fish the subject ponds. Because of the relatively low level of use, wildlife disturbance, compaction of soil and vegetation, and other impacts to refuge resources are not anticipated to be significant. When conducted in the manner prescribed, and at the current use level, it is unlikely that fishing would adversely affect Refuge resources or public safety. Monitoring fishing use will provide needed information for a compatibility review in the CCP process.

AVAILABILITY OF RESOURCES:

The resources necessary to provide and administer this use are available within current and anticipated Refuge budgets. Staff time associated with administration of this use is maintaining associated road infrastructure, collecting visitor use data, analyzing use patterns, monitoring potential impacts of the use on Refuge resources, and providing information to the public about the use.

The program is administered by the Deputy Refuge Manager, resource impacts are monitored by the Wildlife Biologist, visitor use is monitored by a Park Ranger and Outdoor Recreation Planner, and maintenance and repair will be performed by a Heavy

Equipment Operator. Additionally, resource protection is provided by a Park Ranger (Refuge Officer) and Deputy Refuge Manager.

Refuge vehicles are needed to effectively administer the use. The Heavy Equipment Operator performs the maintenance and repair of Refuge roads, parking lots, and associated structures. The refuge has heavy equipment including a motor grader, dump truck, bulldozer, backhoe, 4x4 farm tractor, bobcat, and front-end loader. The construction of a maintenance facility is currently funded and planned for construction in 2003. The maintenance facility is needed to repair refuge vehicles and equipment and to construct necessary signs, kiosks, gates, and other maintenance operations.

Annual costs associated with the administration of public fishing on the Refuge are estimated below:

Road maintenance and repair, sign installation and kiosk construction and repair, maintaining parking areas, and picking up and removing litter associated with bank fishing activities

WG-10 Equipment Operator for 10 work days = \$1,619.20

Planning and supervising staff to monitor the use and its effects on environment and other visitors

GS-12 Deputy Refuge Manager for 3 work days = \$624.24

Resource Protection, monitoring fishing activities and interactions with other users, visitor services, sign maintenance, litter removal

GS-9 Park Ranger for 5 work days = \$770.00

Monitoring habitat impacts from fishing activities

GS-11 Wildlife Biologist for 2 work days (training & interagency coordination) = \$347.20

GS-9 Wildlife Biologist for 2 work days (sampling, electro shocking etc.) = \$296.48

GS-6 Biological Science Technician for 3 work days (sampling, electro shocking etc.) = \$396.36

Providing information to the public about public fishing on the Refuge

GS-11 Outdoor Recreation Planner for 2 work days = \$393.44

Motor vehicle fuel / law enforcement patrols = \$100.00

Heavy equipment fuel = \$200.00

Kiosk construction, signs, printing maps and information = \$1,500.00

Grand Total Estimated Costs = \$6,246.92

FY 2002 Budget Allocations:

Employee Salaries and benefits = \$404,386

Fixed costs (utilities, fuel) = \$15,400

Base maintenance = \$50,000

Discretionary Funds (seasonal LE officer salary, maps, printing, etc.) = \$195,614

Total Available Funds for FY 2002 = \$665,400

Based on a review of the budget allocated for recreational use management, funding is adequate to ensure compatibility and to administer and manage the recreational use listed.

ANTICIPATED IMPACTS OF THE USE:

Potential impacts of fishing access include: soil compaction and erosion, downstream sedimentation, trampling and mortality of fragile wetland plant communities, habitat loss/deterioration, and wildlife disturbance. These threats are described below based on literature reviews and staff field examinations:

Impacts to Plants: Foot travel to fishing locations can have indirect impacts to plants by compacting soils and diminishing soil porosity, aeration and nutrient availability that affect plant growth and survival (Kuss 1986). Hammitt and Cole (1998) note that compaction limits the ability of plants to re-vegetate affected areas. Repeated foot travel can crush plants. Rare plants with limited site occurrence are particularly susceptible. Many plant species considered rare in the state are found associated with riparian wetlands in the Canaan Valley (Bartgis and Berdine 1991). Fishing along riparian corridors may cause disproportionate trampling impacts to rare plants than other public use activities.

Walking to fishing areas during the growing season could cause increased damage to plants in the wetland communities. Plants in the process of growth and producing flowers and, are growing in wet or moist soils, are the most sensitive to disturbance from trampling effects (Kuss 1986). Moist and wet soil conditions are common in Canaan Valley, particularly during spring and early summer, and are directly associated with areas around beaver ponds and along riparian corridors where fishing occurs.

It is anticipated that allowing fishing access will cause minor vegetation loss. Foot travel may slightly increase root exposure and trampling, and some rare plant species could be impacted through cross-country travel. Continuing pedestrian access for fishing, at the current low level of use, is not anticipated to cause any significant impacts to plants or plant communities.

Impacts to Soils: Soils can be compacted and eroded as a result of continued foot traffic. All soils associated with wetland habitats were rated as either high or very high in their potential for compaction (Bell 2002). Impacts to soils will likely be greater during the growing season due to the greater soil moisture content at that time of year. The Mauch Chunk derived soil in Canaan Valley is particularly vulnerable to mechanical erosion when the vegetation has been removed (Rizzo 2002). If compacted, Mauch Chunk soils

can facilitate rapid water runoff that accelerates erosion down slope (Rizzo 2002). Field investigations of trails in Canaan Valley have documented extensive damage displaying classic examples of the erosive nature of Mauch Chunk derived soils after years of unregulated use. In addition, many trails are now trapping and channeling water creating more erosive conditions. Although foot travel did not create highly erosive conditions in this soil type, lug soles of hiking boots could perpetuate the problem. Fishing along river corridors may cause bank erosion allowing sediment to enter the Blackwater River and its tributaries.

It is anticipated that minor impacts to soils will occur as a result of allowing fishing access on the refuge. Erosion potential will likely vary during the year based on soil moisture and temperatures. At current the current use level, impacts to soils (erosion, compaction) are not likely to be significant.

Hydrologic Impacts: Anglers may create new trails from repeated access to popular fishing sites. Trails can affect the hydrology of an area, primarily through alteration of drainage patterns. Bartgis and Berdine (1991) note that roads and trails can divert water from their original drainage patterns in Canaan Valley. This can result in some drainages becoming dry while others accelerate erosion by being forced to carrying more water. Zeedyk (2002) documented many instances in Canaan Valley where existing trails were channeling water away from historic wetlands and, in some cases, causing erosion and sedimentation of bog and other wetland communities. These problems have “profoundly if not irreversibly altered” the extent, depths, characteristics and function of the wetlands on the Main Tract (Zeedyk 2002).

It is anticipated that minor hydrologic impacts may occur from angler foot traffic on existing and possibly, new trails. Maintenance will be required to create adequate and proper drainage so that existing routes do not impact local hydrology. These impacts are not likely to be significant at the existing low level of fishing use.

Wildlife Impacts: The presence of anglers can impact wildlife. Disturbances vary with the species involved and the type, level, frequency, duration and the time of year such activities occur. Whittaker and Knight (1998) note that wildlife response can include attraction, habituation, and avoidance. These responses can have negative impacts to wildlife such as mammals becoming habituated to humans making them easier targets for hunters. Human induced avoidance by wildlife can prevent animals from using otherwise suitable habitat (Pomerantz et al. 1988).

Foot travel to fishing areas will generally occur on established trails where walking requires less effort. Trails can disturb wildlife outside the immediate trail corridor (Trails and Wildlife Task Force 1998, Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where common species (i.e., American robins) were found near trails and rare species (i.e. grasshopper sparrows) were found farther from trails. Songbird nest failure was also greater near

trails (Miller et. al 1998).

When existing trails are flooded, cross-country travel will be necessary to access Main Tract fishing areas. Disturbance will occur in a less regular or predictable pattern from activities conducted along trail corridors. Humans walking off trail have been shown to cause greater disturbance (greater area of influence, flush distance and distance moved) to wildlife than walking within trail corridors (Miller et al. 2001). Predictability of disturbance (on trail vs. off trail) has been cited as a major factor in impacts to wildlife. Walking off trail is considered less predictable to wildlife and typically more disruptive (Trails and Wildlife Task Force 1998, Miller et al. 2001, Knight and Cole 1991).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increase energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Knight and Cole (1991) suggest recreational activities occurring simultaneously may have a combined negative impact on wildlife. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland areas" can dramatically change the normal behavior of wildlife mostly through "unintentional harassment. "

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young. Year-round fishing may disturb wildlife during sensitive periods of their life cycle.

It is anticipated that there will be temporal disturbances to wildlife species because of walking and fishing around ponds. Fishing at beaver ponds may have a greater disturbance to birds than walking on pedestrian routes. State listed Species of Concern (Appendix 1) such as alder flycatchers (*Empidonax alnorum*), American bitterns (*Botaurus lentiginosus*), Virginia rails (*Rallus limicola*), and American black ducks (*Anas rubripes*) nest and feed in and around beaver ponds. Due to the scarcity and small size of ponds in Canaan Valley, birds likely concentrate in these waters and therefore are vulnerable to disturbance by anglers. Prolonged angler presence at these areas could disrupt normal nesting behavior and possibly disturb nests in the vegetation surrounding the ponds. Waterbirds may also be prevented from resting and feeding on water bodies by angler presence (Havera et. al 1992).

Similar impacts may occur from fishing along riparian corridors. Stream and river corridors are known to be important areas for a variety of wildlife species and typically have greater species diversity than other habitats (Trails and Wildlife Task Force 1998, Technical Riparian Work Group 1992). Therefore, disturbance to riparian corridors may have a disproportionate affect on wildlife using Refuge habitats.

Impacts to wildlife may be indirectly caused through erosion and subsequent sedimentation of streams and vernal pools because of foot travel over bare soils and

around drainages. Amphibians lay eggs in the shallow pools that surround beaver ponds on the Main Tract during spring and summer. Species such as spotted salamanders (*Ambystoma maculatum*), red-spotted newt (*Notophthalmus viridescens viridescens*), pickerel frog (*Rana palustris*), American toad (*Bufo americanus americanus*) and wood frogs (*Rana sylvatica*) nest and feed in these locations. Anglers using beaver ponds could potentially disturb and destroy egg masses in the early spring by wading in and through these shallow pools.

Sedimentation can directly kill aquatic invertebrates which impacts the success of amphibian larvae and adults (Sadoway 1981). Observations by refuge staff in 2002 document numerous occurrences of amphibian egg masses that failed after becoming coated in sediment from eroding trails and roads nearby. Bartgis and Berdine (1991) report that sedimentation was damaging habitat in Canaan Valley and could cause impacts to the rare plants, water quality and possibly affect habitat of the southern water shrew (*Sorex palustris punctulatus*), a state Species of Concern.

Anticipated disturbances to wildlife are likely to be short term and infrequent based on the current level of use. Sedimentation impacts will likely be minor from foot travel. Long-term impacts may include certain wildlife species avoiding trail corridors as a result of this use over time. Based on the current low level of fishing use it is not expected that disturbance impacts will be significant.

Threatened and Endangered Species Impacts: The threatened Cheat Mountain salamander (*Plethodon nettingi*) is found on the refuge. Potentially occupied habitat exists for endangered West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*). Both species are found associated with high elevation forested habitat, typically with some component of red spruce (*Picea rubens*) and/or Eastern hemlock (*Tsuga canadensis*). Although no surveys have been conducted in the lower elevations of the Canaan Valley for these species, it is likely they are restricted to the cooler mountain slopes and ridges. Primary access for fishing will occur only in the lower elevations and valley floor and will not traverse known or potentially occupied habitat of either species. Therefore, there are no anticipated impacts to these species as a result of allowing fishing access.

User Conflicts: Conflicts between recreational uses are commonly reported in the literature (Knight and Gutzwiller 1995, Ramthun 1995, Watson et. al 1994, Chavez et al 1993). Conflicts range from concerns over personal safety to certain user groups feeling that they should be given priority over other groups based on a past history or other reasons. Conflicts may occur if other users are not able to access the same areas as anglers or if anglers disrupt observation of wildlife. Based on interviews with individuals and user groups, conflicts among groups are not significant in Canaan Valley. This is likely due to the relatively low number of users in the area as compared with heavy use and conflict sites reported in the literature.

The current use is viewed as an effective and justifiable method of access that enables the public to discover, experience, and enjoy the Refuge and participate in a priority public

use. Potential habitat degradation from angler foot traffic to breeding/nesting birds and wildlife species warrants monitoring. Refuge staff began an inventory program in 2002 to detect potential impacts to wildlife and plant communities and will summarize findings for CCP planning. Due to the low level of fishing activity occurring on beaver ponds and rivers on the Refuge, no significant impacts to refuge resources are anticipated.

Cultural Resources: This use, as described, will not impact cultural resources.

PUBLIC REVIEW AND COMMENT: A draft was sent out for public review and comment on November 6, 2002 for 30 days. Due to public requests, the deadline for public review and comment on this draft pre-acquisition compatibility determination was extended for an additional 30 days to January 6, 2003. The refuge also hosted two open houses to address public concerns on November 22, 2002 and December 12, 2002. A determination was made following the comment period.

DETERMINATION: THIS USE IS COMPATIBLE ☒
 THIS USE IS NOT COMPATIBLE ☐ (Check one)

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Fishing is allowed during Refuge open hours: one hour before sunrise and one hour after sunset.
- No overnight parking or camping is permitted.
- Signs necessary for visitor information, safety, and traffic control are installed and maintained as necessary.
- The Refuge conducts an outreach program to promote public awareness and compliance with Refuge public use regulations.
- A comprehensive inventory of the effects of existing road infrastructure on wetland hydrology is completed as funding permits. Of priority concern is A-frame Road and its associated trail network that encroaches into wetland areas. This information would identify CCP management opportunities for restoring surface hydrology.
- Cross-country travel for fishing is restricted to pedestrian access only.
- The current inventory of roads and trails on the refuge is completed before the start of the Refuge CCP. This information guides future decisions in the planning, locating, and managing of Refuge road and trail systems.
- Anglers accessing the Blackwater River by non-motorized watercraft enter the Refuge from outside Refuge boundaries.

-Routes designated for public access are monitored annually to determine if they continue to meet the compatibility criteria presented in Appendix 2. Monitoring for biological and physical resources is listed in Appendix 3 but the methodology may change to reflect new information. Biological inventories continue to provide baseline information to measure change. Should monitoring and evaluation of the use indicate that the compatibility criteria are or will be exceeded, appropriate action will be taken to ensure continued compatibility, including modifying or discontinuing the use.

-Refuge Officer patrols include recording visitor numbers, vehicle numbers, visitor activities, and activity locations to document current and future levels of Refuge use. Patrols also include the routine assessment of safety conditions and visitor interactions on Refuge routes. Conditions that are or will risk public safety will be identified and appropriate action will be promptly taken to correct such conditions.

-The Refuge conducts annual assessments of visitor perceptions of Refuge uses and the management of access routes. A visitor survey is developed and executed upon approval. Providing for safe public use through proper administration and regulation, public education, and law enforcement will be essential.

JUSTIFICATION:

Fishing has been determined to be compatible provided the above stipulations are implemented. Fishing, as identified in this Compatibility Determination, is not expected to materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the Refuge was established. Monitoring will be conducted to ensure this use remains compatible. If significant impacts are found, corrective actions will be taken to protect Refuge resources.

Signature: Refuge Manager:

(Signature and Date)

Concurrence: Regional Chief:

(Signature and Date)

Mandatory 15 year re-evaluation date: April 1, 2018

ATTACHMENTS:

Appendix 1: List of state species of special concern

Appendix 2: Checklist for route compatibility

Appendix 3: Route monitoring plan

Appendix 4: Responses to public comments

Citations

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Appendix 1 List of State Species Of Special Concern

State Species of Concern Known or Expected to Occur in Canaan Valley, WV
West Virginia Division of Natural Resources Natural Heritage Program

Plants		Ranks	
Scientific Name	Common Name	State	Global
<i>Abies balsamea</i>	Balsam fir	S3	G5
<i>Amelanchier bartramiana</i>	Oblong-fruited serviceberry	S1	G5
<i>Betula papyrifera</i>	Paper birch	S2	G5
<i>Carex aestivalis</i>	Summer Sedge	S2	G4
<i>Carex atherodes</i>	Awned sedge	S1	G5
<i>Carex atlantica</i> ssp. <i>capillacea</i>	Howe sedge	SH	G5
<i>Carex bromoides</i>	Brome-like sedge	S2	G5
<i>Carex buxbaumii</i>	Brown bog sedge	S2	G5
<i>Carex canescens</i>	Hoary sedge	S3	G5
<i>Carex comosa</i>	Bearded sedge	S2	G5
<i>Carex lacustris</i>	Lake sedge	S2	G5
<i>Carex leptoneuria</i>	Finely-nerved sedge	S1	G4
<i>Carex pauciflora</i>	Few-flowered sedge	S1	G5
<i>Carex pellita</i>	Wooly sedge	S1	G5
<i>Carex project</i>	Necklace sedge	S1	G5
<i>Coptis trifolia</i> ssp. <i>groenlandica</i>	Goldthread	S2	G5
<i>Cuscuta rostrata</i>	Beaked dodder	S2	G4
<i>Cypripedium reginae</i>	Showy lady's-slipper	S1	G4
<i>Dalibarda repens</i>	Star violet	S3	G5
<i>Drosera rotundifolia</i>	Roundleaf sundew	S3	G5
<i>Equisetum sylvaticum</i>	Woodland horsetail	S1	G5
<i>Euphorbia purpurea</i>	Glade spurge	S2	G3
<i>Geum aleppicum</i>	Yellow avens	S1	G5
<i>Geum rivale</i>	Purple avens	S1	G5
<i>Glyceria grandis</i>	American manna-grass	S2	G5

<i>Glyceria laxa</i>	Northern manna-grass	S1	G5
<i>Juncus articulatus</i>	Jointed rush	S2	G5
<i>Juncus filiformis</i>	Thread rush	S2	G5
<i>Listera smallii</i>	Kidney-leaf twayblade	S2	G4
<i>Lonicera canadensis</i>	American fly-honeysuckle	S2	G5
<i>Oenothera pilosella</i>	Evening-primrose	S2	G5
<i>Pogonia ophioglossoides</i>	Rose pogonia	S2	G5
<i>Polemonium vanbruntiae</i>	Jacob's ladder	S2	G3
<i>Ranunculus pusillus</i>	Low spearwort	S1	G5
<i>Rhamnus alnifolia</i>	Alder-leaved buckthorn	S1	G5
<i>Salix discolor</i>	Glaucous willow	S2	G5
<i>Saxifraga pensylvanica</i>	Swamp saxifrage	S2	G5
<i>Scirpus atrocinctus</i>	Black-girdle bulrush	S3	G5
<i>Scirpus microcarpus</i>	Small-fruit bulrush	S3	G5
<i>Scutellaria galericulata</i>	Hooded skullcap	S1	G5
<i>Stachys tenuifolia</i> var. <i>tenuifolia</i>	Smooth hedge-nettle	S2	G5
<i>Stellaria borealis</i> ssp. <i>borealis</i>	Northern stitchwort	S1	G5
<i>Synosma suaveolens</i>	Sweet-scented Indian-plantain	S2	G3G4
<i>Thelypteris simulata</i>	Bog fern	S1	G4G5
<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Manna-grass	S2	G5?
<i>Torreyochloa pallida</i> var. <i>pallida</i>	Pale manna-grass	S2	G5?
<i>Vaccinium macrocarpon</i>	Large cranberry	S2	G4
<i>Vaccinium oxycoccos</i>	Small cranberry	S2	G5
<i>Veronica scutellata</i>	Marsh speedwell	S1	G5
<i>Viola appalachensis</i>	Appalachian blue violet	S2	G3
<i>Vittaria appalachiana</i>	Appalachian gametophyte	S1	G4
<i>Zigadenus leimanthoides</i>	Oceanorus	S2	G42

Animals		Rank	
Scientific Name	Common Name	State	Global
<i>Accipiter gentilis</i>	Northern goshawk	S1B,S1N	G5

Aegolius acadicus	Northern saw-whet owl	S2B,S3N	G5
Carphophis amoenus	Worm snake	S3	G5
Chlosyne harrisii	Harris' checkerspot	S2	G4
Circus cyaneus	Northern harrier	S1B,S3N	G5
Clinostomus elongatus	Redside dace	S1S2	G4
Colias interior	Pink-edged sulphur	S1	
Empidonax alnorum	Alder flycatcher	S3B,S3N	G5
Euphyes bimacula	Two-spotted skipper	S1	G4
Glaucomys sabrinus fuscus	West Virginia northern flying squirrel	S2	G5
Neotoma magister	Allegheny woodrat	S3	G3G4
Microtus chrotorrhinus carolinensis	Rock vole	S2	G4
Plethodon nettingi	Cheat Mountain salamander	S2	G2
Sorex palustris punctulatus	Water shrew	S1	G5
Sylvilagus obscurus	Appalachian cottontail	S3	G4
Zapus hudsonius	Meadow jumping mouse	S3	G5

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Ranking Descriptions

- S1 Five or fewer documented occurrences, or very few remaining individuals within the state. Extremely rare and critically imperiled.
- S2 Six to 20 documented occurrences, or few remaining individuals within the state. Very rare and imperiled.
- S3 Twenty-one to 100 documented occurrences.
- S4 Common and apparently secure with more than 100 occurrences.
- S5 Very common and demonstrably secure.
- SH Historical. Species which have not been relocated within the last 20 years. May be rediscovered.
- G1 Five or fewer documented occurrences, or very few remaining individuals globally. Extremely rare and critically imperiled.
- G2 Six to 20 documented occurrences, or few remaining individuals globally. Very rare and imperiled.
- G3 Twenty-one to 100 documented occurrences. Either very rare and local throughout it's range or found locally in a restricted range; vulnerable to extinction.
- G4 Common and apparently secure globally, though it may be rare in parts of it's range, especially at it's periphery.
- G5 Very common and demonstrably secure, though it may be rare in parts of its range, especially at the periphery.
- G? Unranked, or, if following a number, rank uncertain (ex. G2?)
- G_Q Species of questionable taxonomy (ex. G4Q).

Appendix 2 Checklist For Route Compatibility

Checklist For Existing Routes To Be Eligible For Interim Compatibility Consideration

(Routes must meet all criteria)

- 1) Route provides an opportunity to view a variety of habitats and wildlife.
- 2) Route is an existing road or trail that provided access or is in close proximity to access that supported priority public uses.
- 3) Route is safe for the access proposed at current use levels.
- 4) Any refuge entry route was open to public access based on historic use.
- 5) Route requires minimal annual maintenance (i.e, waterbars, stepping stones, etc.) to ensure safe access and to prevent further habitat degradation.
- 6) Route has a low potential for fragmenting habitat or disturbing wildlife populations.
- 7) Based on existing soils information, less than 50% of the route's length occupies soil types rated as "high" or "very high" for compaction and/or erosiveness. The route is not rated as "severely limited" for hiking trails based on the Tucker County Soil Survey.
- 8) Any route crossing of sensitive soils occupies the shortest possible distance. Organic soil crossings are minimized or eliminated.
- 9) Continued use of the existing route is not likely to cause further wetland alteration or degradation. There is low risk that hydrology, soil stability, sensitive plant communities, riparian zones, and wildlife habitats would be adversely affected.
- 10) Route predominately occupies modified substrate (graveled, compacted, or filled) like logging roads and rail grades.
- 11) Route is not incised greater than 1 foot deep over 10% of its total length.

Appendix 3 Route Monitoring Plan

Physical Condition Monitoring:

A baseline inventory of the physical condition of access routes open to public use was conducted during the 2002 field season. This information will be used to monitor how continued public use affects plants and soils associated with current designated routes. Changes in physical conditions of the routes will be used to identify any management interventions required to protect refuge resources. Interventions will occur where surveys document increases in the frequency and lineal extent of “problem areas”. Current trail conditions on much of the refuge were primarily influenced by the use of motorized vehicles prior to acquisition by the USFWS. The standard that will be set for refuge trails is a non-degradation policy such that existing “problem areas” will not increase in size, number or frequency. It is intended that access limitations will improve currently degraded vegetation and soil conditions. Improvement will be defined as reducing “problem areas” by : narrowing trail width, decreasing numbers of “bootleg” trails through revegetation, fewer mud holes, less soil erosion, and fewer areas of exposed roots. Information generated from this survey will include the following products:

- A description of the frequency of “problem areas” on targeted trails
- A description of the average physical characteristics of trail features
- A description of the lineal extent of “problem areas”
- A repeatable monitoring protocol that will track the trend of physical condition of refuge trails.
- Trail management recommendations to halt continued trail degradation and vegetation trampling and promote revegetation.

Biological Monitoring:

Wildlife associated with public access routes will be monitored to detect any impacts from public use. Monitoring will occur seasonally to document how species use of associated habitats is affected throughout yearly life cycles. Point counts during early summer will be used to inventory nesting bird species and to compare results with areas not influenced by public access. Transects will be established and monitored to determine how different species are influenced by the presence of a particular trail or road (i.e. for brood habitat, nesting, movement corridors etc.). Amphibian and avian surveys will be conducted during early spring for breeding and late summer for movements. Monitoring during winter will evaluate the importance of routes to mammals for winter movements and feeding areas. Vegetation surveys will be conducted to detect the presence of rare, unique or exotic invasive plant species located on proposed public access routes.

Inventory results will be reviewed annually to ensure that proposed routes continue to meet compatibility requirements. Management intervention to correct significant problems will occur if monitoring indicates that public use is impacting wildlife or plant species and/or populations. Remedies will be based on the significance of impacts and practical options for reducing or eliminating them. Intervention may include investigative research projects.



Figure 1: Map showing known fishing areas on Main tract